

# BUILDERS HANDBOOK


## OF NATCO HOLLOW TILE CONSTRUCTION

NATIONAL FIRE-PROOFING  
• COMPANY •



PITTSBURGH PENNSYLVANIA





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## *INTRODUCTION*

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**T**HIS volume is a complete and practical text book for the guidance of the builder in every detail of setting hollow tile.

The methods illustrated and described represent the practice most approved by fireproofing engineers and architects. They have been determined by wide practical experience in NATCO Hollow Tile construction particularly and may be accepted as standard in all hollow tile operations.

**NATIONAL  
FIRE PROOFING COMPANY  
PITTSBURGH, PA.**

# SPECIFICATION SHEET FOR ERECTING NATCO HOLLOW TILE.

**GENERAL:**—Provide and erect all the Natco Hollow Tile exterior walls, interior bearing partitions, subdividing partitions, etc., as shown on plans. All material must be hard burned, true and regular in size and for exterior walls shall have all faces scored with special dove-tail scoring to offer a good surface for the stucco finish. Blocks cracked or broken on the outside shells will not be acceptable under this specification. In general the terra cotta blocks must be Natco Hollow Tile manufactured by the National Fire Proofing Co.

**LAYING:**—All blocks used in the exterior walls and interior bearing partitions, must be laid with the holes or cores vertically in the wall, in order to develop their full strength. Interior subdividing partitions may be laid on the side if desired.

**MORTAR:**—All mortar used for laying up the Terra Cotta Blocks shall consist of a standard Portland cement and clean sharp sand in the proportion of one part cement to three parts sand, well mixed to a smooth, moderately stiff mortar. Lime not to exceed 10 per cent of the mass by volume, will be allowed in the mortar.

**FOUNDATION WALLS:**—Where so indicated on plans, the foundation walls from top of footings to the underside of first floor beams shall be constructed of 9-hole 12x12x12 Natco Hollow Tile Blocks. Care should be taken at the corners to use 6x12x12 blocks to secure a running bond in the wall. Outside of walls from footing to a point above the ground shall be given a heavy coat of waterproof cement plaster or other approved damp-proofing.

Where columns or piers supporting heavy loads rest on the foundation wall the same will be filled with concrete from footing to top of wall to prevent the possibility of failure due to compression.

**EXTERIOR WALLS AND BEARING PARTITIONS:**—Exterior walls and partitions will be of thickness shown on the plans and must be in accordance with the foregoing conditions of quality, etc.

**SUBDIVIDING PARTITIONS:**—Subdividing partitions will be of hard burned Natco Terra Cotta Blocks (scored for plastering) with a percentage of full porous blocks or wood blocks for nailing purposes. All partitions must be started on the structural floor and wedged against the floor arch above.

**JAMB BLOCKS:**—Provide for all hung windows, special Jamb Blocks with rabbetted openings, to receive the window frame box. Fill well with mortar the space between the blocks and the frame box to within 1 inch of stop bead and caulk to stop bead with roofers cement to prevent the passage of air or moisture through same.

**LINTELS:**—Openings not exceeding 5'-0" in clear span may be spanned with special Natco Arch Lintel blocks or with ordinary stock tile reinforced with rods in lower cells and filled solid with concrete.

Openings over 5'-0" in clear span to be spanned with reinforced concrete girder, or with steel LS—size of structural or reinforcing steel variable with load and span.

**SILLS:**—Form all sills of Natco Hollow Tile sill block. Care must be taken to fill all joints so as to prevent moisture working through the same, wood sill of frame to be set in a heavy bed of roofers cement.

**ARCH OPENINGS:**—Build all arch openings shown on plans of two course rowlock common or hollow brick header arches, carefully laid on substantial centres. Arches will spring from the Terra Cotta Block and must be well bedded on same.

**PORCH COLUMNS AND PIERS:**—Construct the porch columns and piers, to sizes as shown, of Hollow Terra Cotta Blocks. Where column finish is round, build same of 3 inch round Hollow Terra Cotta column covering, filling the same with concrete where the second story walls are supported by them. Square columns shall be built of the proper size wall tile.

**FLOOR BEAM BEARINGS:**—Provide and set Terra Cotta slabs 1 inch thick under all wood floor beams as bearing plates for same. These slabs will also be used for working up to levels and story heights when the full or half blocks do not work out correctly.

**BEAM COURSES:**—Wood floor beams to be framed into exterior walls as shown on detail, using in 8 inch walls 3x12x12 inch Natco Hollow Tile for facing ends of beams and 4 inch tile for filling between beams. In 10 inch walls use 5x12x12 inch tile for facing ends of beams and 4 inch tile for filling between beams. In 12 inch walls use 6x12x12 inch tile for facing ends of beams and 5 inch tile for filling between beams.

**ROOF PLATES:**—Embed at intervals of five feet in the wall under the roof plate, three quarter-inch bolts 30 inches long with nut and washers and projecting 6 inches above the top of wall, to allow of the plate being fastened down. Fill around bolts with cement grout before placing roof plate. One inch slabs should be placed on the tile course directly below bolts.

## FLOOR CONSTRUCTION

**GENERAL:**—Floor construction will be of type known as the Combination Hollow Tile and concrete floor arch construction, consisting generally of 4 inch reinforced concrete beams spaced 16 inches on centers with Hollow Tile Blocks between, or the Johnson system laid on a 1 inch bed of 1 to 3 cement and sand with metal fabric bedded therein, all to have at least 4 inch bearing on walls.

**CONCRETE:**—All concrete used in floor construction shall consist of one part Portland cement, two parts clean sharp sand, and four parts broken stone or gravel of such size as will pass through a three-quarter inch ring. Concrete will be of wet mixture and must be well tamped and worked around reinforcing steel after pouring.

**REINFORCING STEEL:**—Steel rods for floor construction must be of such type as will offer a mechanical bond with the concrete. Corrugated, twisted or similar type will be acceptable. Steel must have an elastic limit of not less than one-half the tensile strength. Rods must be clean and free from rust scales before placing in position and must be placed not over 1 inch above bottom of floor.

**TILE:**—Depth of tile filler blocks and size of steel reinforcing rods will be regulated by span and load to be carried and will be of size indicated on the plans. All blocks must be wet before concrete is placed so as to insure a good bond with the concrete.

**CENTERS:**—Centers must be of such size to insure of their not deflecting under the weight of the wet concrete, and must be provided in such quantity as to insure of speedy work. Care must be taken not to remove the centers before the concrete is hard, and under long spans a center line of supports must be maintained for at least three weeks after the concrete has been poured. In cold weather the centers must be left in place until directed by the Architect to remove them.

## SPECIFICATIONS FOR STUCCO ON HOLLOW TILE

The surface to which scratch coat is applied shall be free from all foreign material and shall be thoroughly wetted down before the first coat is applied; the first coat to be thoroughly scratched to insure proper bond for the coat to follow. The second coat shall be applied as soon as prior coat has sufficiently set to allow working upon same, and should be straightened with darby and straight edge, and floated with cork or wooden float to prevent waves showing on finished wall.

Should it be impossible to apply the second and latter coats as soon as the former coat has become thoroughly set, it is advisable to wet down the coat which has been applied as this gives a better bond between successive layers.

All finish coat work should as far as possible, be applied to the entire area of one side of structure at one operation. No finished coat work should be left in an unfinished condition. All work should be covered to corners.

Thickness of coats should average from  $\frac{1}{4}$  to  $\frac{1}{2}$  of an inch. To get best results, three coats should be applied especially where a smooth or float finish is desired. Two coat work having a total thickness of not less than  $\frac{3}{4}$  of an inch makes quite a satisfactory job for rough cast or pebble dash finish, but three coats makes a better construction.

## MATERIALS

The materials composing the stucco shall consist of:—

(1) Portland cement which has been carefully tested and found to meet the requirements of the American Society for testing materials.

(2) Sand which is free from organic matter or loam and uniformly graded in size from coarse to fine.

(3) Hydrated lime, any good brand of prepared hydrated lime or well burned slaked lime putty will be accepted.

## PROPORTIONS

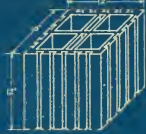
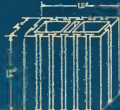
1st Coat—1 cement  
1/10 lime  
2 sand

2nd Coat—1 cement  
1/10 lime  
2½ sand

3rd Coat—1 cement  
1/10 lime  
3 sand

Finish coat of stucco to be waterproofed with an approved brand of Integral Waterproofing Compound or other approved Compound as per directions of manufacturers.

All joints between wood door and window frames at head, sides and sills must be calked tight with oakum or roofers cement before stucco is applied.



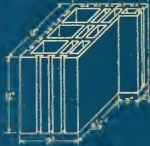
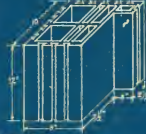
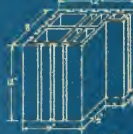
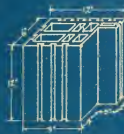
STANDARD WALL BLOCKS.



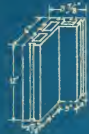
SOLID.



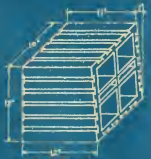
SLABS.



JAMB BLOCKS.



HALF JAMB BLOCKS.



SKEW.



FILLER.



KEY.



FILLER.



SKEW.



SILL.

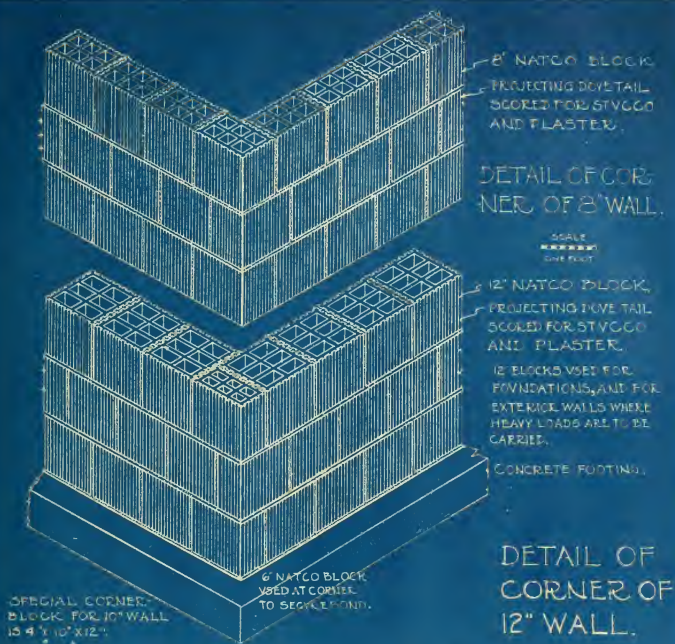
ARCH BLOCKS.

DETAIL OF SHAPES AND SIZES.

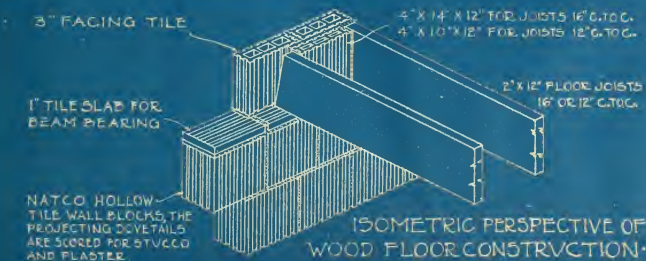


SILL.

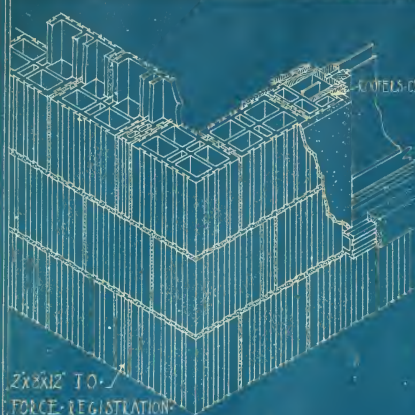




Detail of Foundation and Exterior Wall Construction

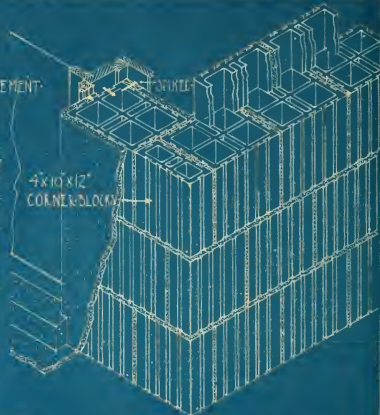


Detail of Wood Joist Construction



2x8x12 TO-  
FORCE REGISTRATION

ISOMETRIC VIEW OF 8" TILE WALL



4x10x12  
CORNER BLOCK

ISOMETRIC VIEW OF 10" TILE WALL



ISOMETRIC VIEW OF 8" TILE SLAB  
MANUFACTURED

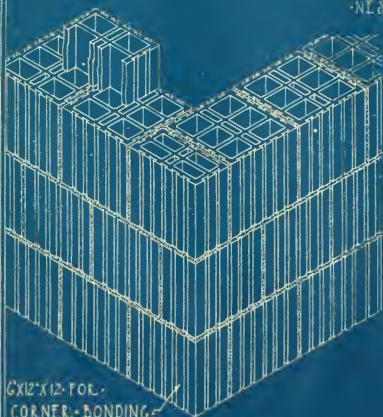


TAP ON CORNERS TO  
SEPARATE SLABS



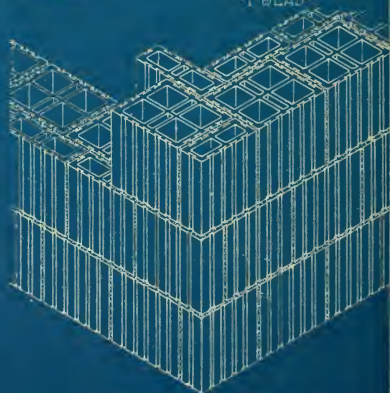
ISOMETRIC VIEW OF SINGLE  
10" SLAB

NEST OF 10" SLABS



6x12x12 FOR  
CORNER BONDING

ISOMETRIC VIEW OF 12" TILE WALL

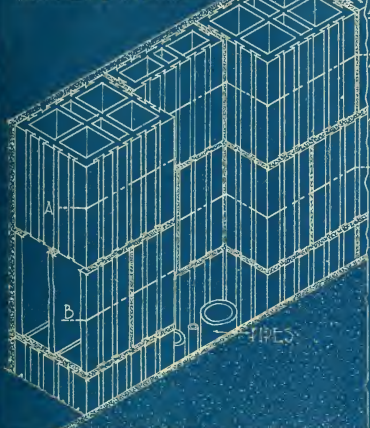


ISOMETRIC VIEW OF 14" TILE WALL



# METHOD OF CHASING IN NATCO

EXTERIOR STUCCO



PIPES

ISOMETRIC VIEW SHOWING 6"x12" CHASE FOR PIPES IN 10" NATCO TILE WALL



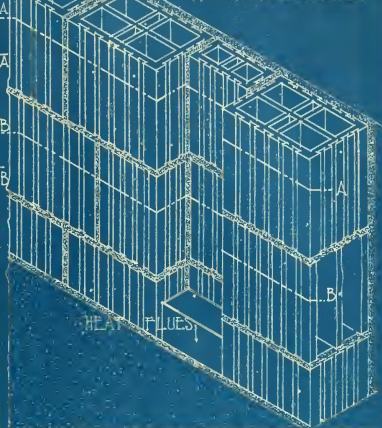
PIPE CHASE  
PLAN THRU LINE A-A



PLAN THRU LINE B-B

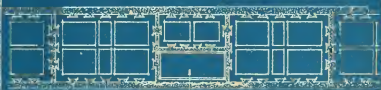
# WALLS FOR HEAT PIPES ETC

EXTERIOR STUCCO

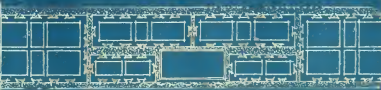


HEAT PIPES

ISOMETRIC VIEW SHOWING 4"x8" CHASE FOR PIPES IN 8" NATCO TILE WALL

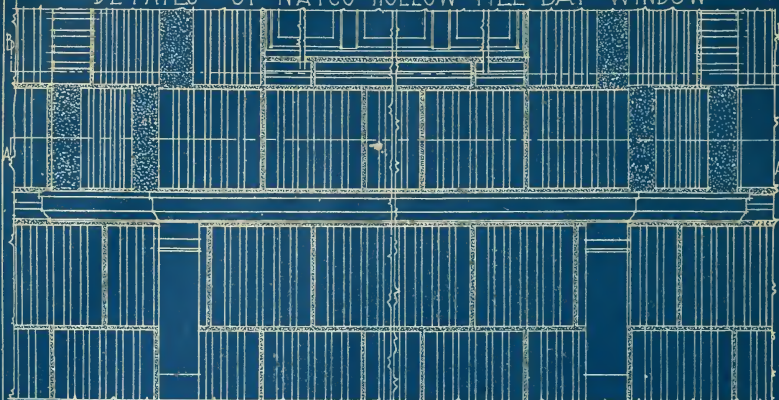


HEAT FLUE  
PLAN THRU LINE A-A

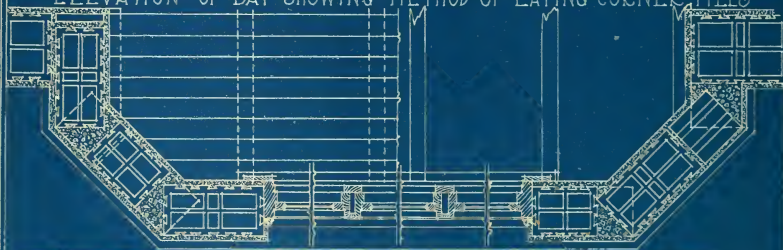


PLAN THRU LINE B-B

·DETAILS · OF · NATCO · HOLLOW · TILE · BAY · WINDOW·



·ELEVATION · OF · BAY · SHOWING · METHOD · OF · LAYING · CORNER · TILES ·



·PLAN-THRU ·  
·LINE-A-A ·

·PLAN-THRU ·  
·LINE-B-B ·

·FLOOR ·LINE·

·JOIST·

·REINFORCED ·CONCRETE ·SLAB ·  
·ORNAMENTAL ·MOULD ·RUN-ON ·FACE ·

·REINFORCED ·CONCRETE ·BRACKETS ·CAST ·IN ·PLACE ·  
·ORNAMENTAL ·FACES ·FORMED ·IN ·CASTING ·

·SIDE ·ELEVATION ·OF ·BAY ·

·SECTION ·OF ·BAY ·

# DETAIL OF TYPICAL DOUBLE HUNG WINDOW CONSTRUCTION

SCALE 1/8" = 1'-0"

NATCO ARCH LITEL WITH SKEW BACKS  
NECESSARY FILTERS & KEY ADAPTED TO OPENING & NOT EXCEEDING  
8" IN CLICAL SPAN  
KEY & FILLER SKEW BACK

STUCCO COVERING

ELEVATION

COVERED WITH LOOSELY-CLING

PLAN SHOWING SPECIAL JAMB & LOCK

REINFORCING  
2000

CONCRETE FILL

PLASTER

STUCCO

PORTLAND CEMENT

STONE

PORTLAND CEMENT

SECTION OF HEAD OF REGULAR BLOCK

SECTION OF HEAD OF SPECIAL BLOCK SECTION OF PATENTED TILE SILL

SECTION OF STONE SILL



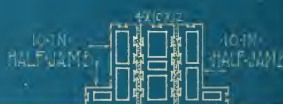
# METHOD OF FORMING PIERS BETWEEN DOUBLE HUNG WINDOWS.

STONE

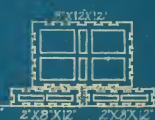
LINTEL

NAIL IN FRAME

STONE SILL COURSE



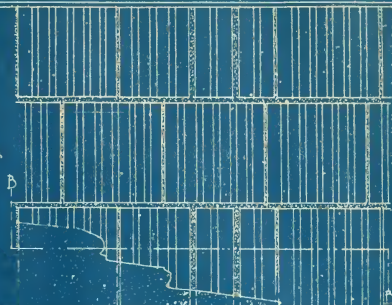
SILL COURSE



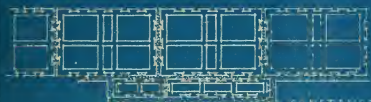
SILL COURSE



ELEVATION OF PIER SIDE



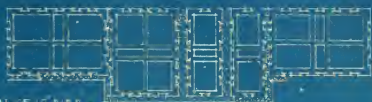
ELEVATION OF WALL SIDE



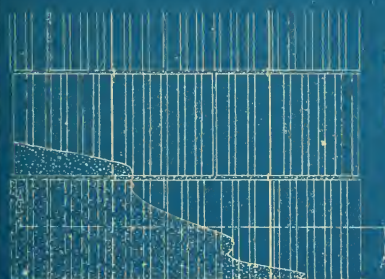
PLAN AT COURSE A-A

CONSTRUCTION OF PIER

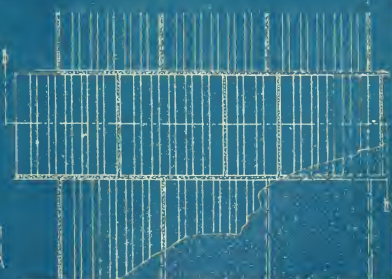
IN A HOLLOW TILE WALL



PLAN AT COURSE E-E



ELEVATION OF PIER SIDE



ELEVATION OF WALL SIDE



PLAN AT COURSE A-A

CONSTRUCTION OF PIER

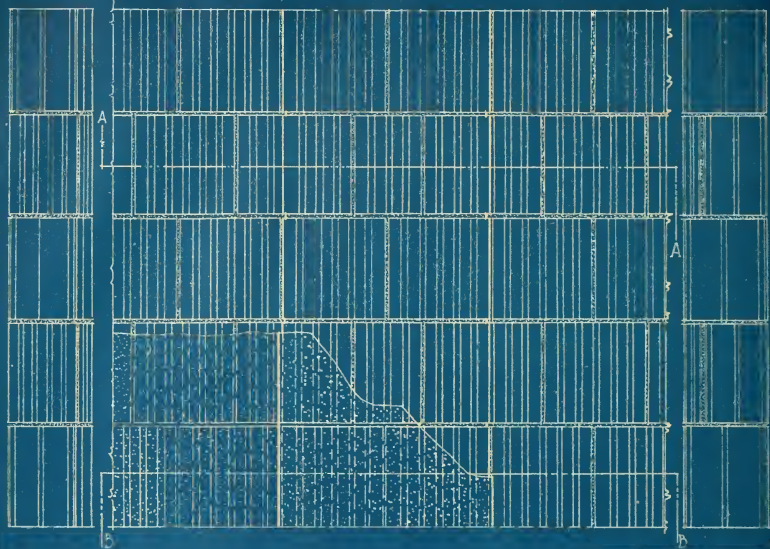
IN A HOLLOW TILE WALL



PLAN AT COURSE E-E



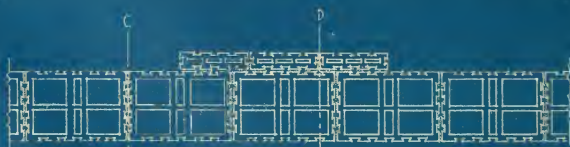
24-INCH PIER OR PILASTER IN AN 8" NATCO WALL.



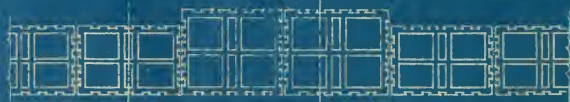
SECTION THRU WALL  
AT C-C

ELEVATION OF PILASTER

SECTION THRU PILASTER  
AT D-D



PLAN AT COURSE A-A



PLAN AT COURSE B-B

WATER-PROOFING

4" HOLLOW-TILE FOR  
BACKING 8" ALABET-WALL

STONE-CORNICE SHOWING  
RELATION TO BRICK & TILE WALL

SECTION THRU TILE &  
STUCCO-WALL SHOWING  
ANGLE-IRON-CLINT & LINTEL

SECTION OF BRICK & TILE WALL

ROOFERS-  
TENDRY

PLANS OF TEX-TILE CORNER & JAMB-PLUG

CRATE

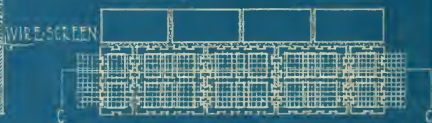
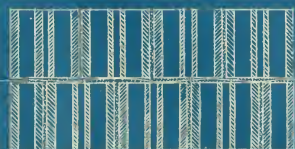
WATER-PROOFING

PLAN OF TILE & BRICK WALL

SECTION THRU TILE & TEX-TILE WALL

SECTION THRU BRICK & TILE WALL

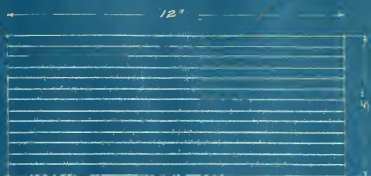
SECTION OF EXTERIOR WALL SHOWING NATCO X WITH  
BRICK FACING BONDED WITH HEADERS EVERY SEVENTH COURSE





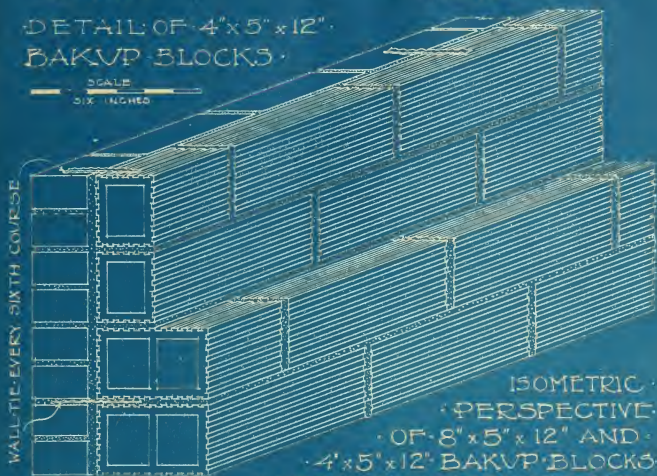


END VIEW

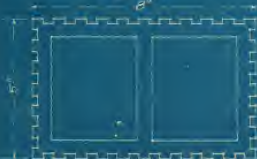


SIDE VIEW

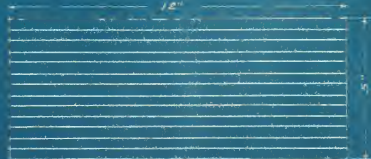
DETAIL OF 4" x 5" x 12"  
BAKVP BLOCKS



ISOMETRIC  
PERSPECTIVE  
OF 8" x 5" x 12" AND  
4" x 5" x 12" BAKVP BLOCKS  
LAID IN WALL WITH BRICK FACING



END VIEW

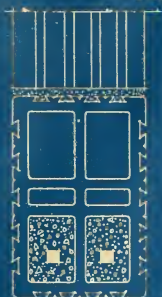


SIDE VIEW

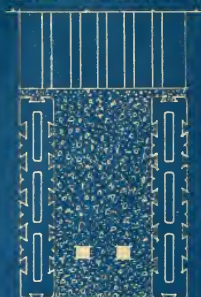
DETAIL OF 8" x 5" x 12" BAKVP BLOCKS



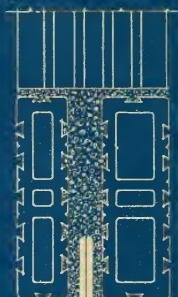
# ·LINTEL·SECTIONS·



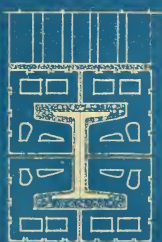
·STOCK·TILE  
·REINFORCED·



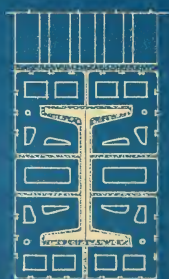
·CONCRETE·BEAM  
·FACED·WITH·2"·TILE·



·STOCK·3/8"·4"·TILE·  
·LINTEL·WITH·ANGLES·



·5"·LINTEL·COVERING·  
·FOR·8·INCH·WALL·



·8"·LINTEL·COVERING·  
·FOR·8·INCH·WALL·



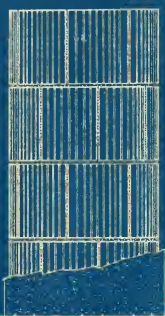
·9"·LINTEL·COVERING·  
·FOR·8·INCH·WALL·



# DETAIL OF HOLLOW TILE PIERS WITH STVCCO COVERING



ELEVATION



ELEVATION

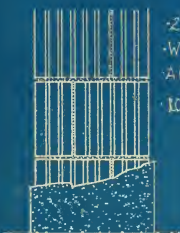


ELEVATION



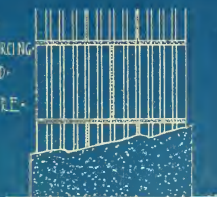
PLANS OF 10" TILE PIER 4' X 8' BLOCKS

14" TILE PIER FILLED WITH CONCRETE AND REINFORCING RODS AT CORNERS 6' X 12' BLOCKS

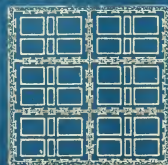
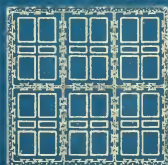
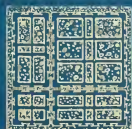
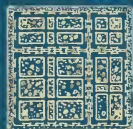


ELEVATION

26" ROUND COLUMN  
WITH OR WITHOUT REINFORCING  
ACCORDING TO LOAD  
RODS WRAPPED WITH WIRE



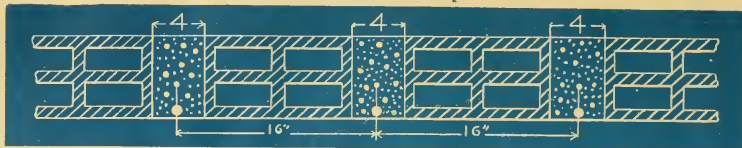
ELEVATION



PLANS OF 20" PIER REINFORCING AT CORNERS

PLANS OF 26" PIER

**SAFE LIVE LOADS in lbs. per sq. ft. for COMBINATION TILE FLOOR  
without concrete top.**

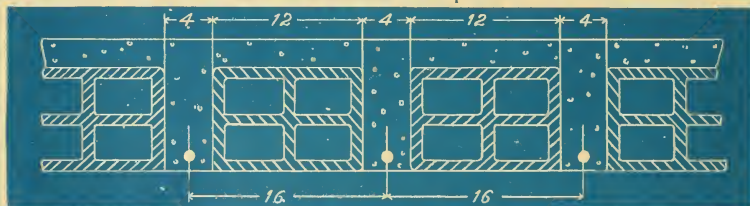


Composition of Concrete: 1 part Portland Cement—2 parts Sand—4 parts Stone or Gravel. Factor of Safety, 4.

**SIZE OF TILE.**

SPAN	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
5'-0"	82	162	262	388	540	...	...	...	...
6'-0"	49	103	170	257	360	482	...	...	...
7'-0"	29	68	115	177	252	340	438	...	...
8'-0"	...	45	79	125	181	248	322	499	...
9'-0"	...	29	54	90	133	185	242	380	...
10'-0"	...	...	37	65	99	140	185	295	506
11'-0"	...	...	24	46	73	106	143	232	404
12'-0"	...	...	...	32	54	81	110	184	326
13'-0"	...	...	...	...	39	61	86	146	266
14'-0"	...	...	...	...	27	46	66	117	218
15'-0"	...	...	...	...	...	33	50	93	179
16'-0"	...	...	...	...	...	...	37	74	148
17'-0"	...	...	...	...	...	...	26	57	121
18'-0"	...	...	...	...	...	...	...	44	99
19'-0"	...	...	...	...	...	...	...	32	81
20'-0"	...	...	...	...	...	...	...	22	65
Reinforced Steel in Each Rib	3/8" Sq.	3/8" Sq.	1/2" Sq.	1/2" Sq.	1/2" Sq.	1/2" Sq.	1/2" Sq.	3/4" Sq.	3/4" Sq.
Weight of Floor per Sq. Ft.	26 lbs.	30 lbs.	38 lbs.	43 lbs.	48 lbs.	52 lbs.	58 lbs.	68 lbs.	82 lbs.

**SAFE LIVE LOADS in lbs. per sq. ft. for COMBINATION TILE FLOOR  
with 2 in. concrete top.**



Composition of Concrete: 1 part Portland Cement—2 parts Sand—4 parts Stone or Gravel. Factor of Safety, 4.

**SIZE OF TILE.**

SPAN	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
5'-0"	665	...	...	...	...	...	...	...	...
6'-0"	446	660	...	...	...	...	...	...	...
7'-0"	314	470	655	...	...	...	...	...	...
8'-0"	229	347	487	650	...	...	...	...	...
9'-0"	170	263	372	499	645	...	...	...	...
10'-0"	128	202	290	392	509	640	...	...	...
11'-0"	97	157	229	313	408	515	635	...	...
12'-0"	74	123	183	252	332	421	521	...	...
13'-0"	55	97	147	205	272	348	432	625	...
14'-0"	41	76	118	168	225	289	361	526	...
15'-0"	29	59	96	138	187	242	304	447	...
16'-0"	...	45	77	113	156	204	258	381	610
17'-0"	...	34	60	93	130	172	220	328	527
18'-0"	...	...	48	76	108	145	187	283	459
19'-0"	...	...	37	61	90	123	159	245	402
20'-0"	...	...	...	49	74	103	136	212	352
21'-0"	...	...	...	38	61	86	116	184	310
22'-0"	...	...	...	...	49	72	98	159	272
23'-0"	...	...	...	...	39	60	83	138	240
24'-0"	...	...	...	...	30	49	70	119	212
Reinforced Steel	3/8" Sq.	1/2" Sq.	3/4" Sq.	1/2" Sq.	3/8" Sq.	1/2" Sq.	1/2" Sq.	1 1/8" Sq.	1 3/4" Sq.
Weight of Floor per Sq. Ft.	50 lbs.	55 lbs.	60 lbs.	65 lbs.	70 lbs.	75 lbs.	80 lbs.	90 lbs.	105 lbs.

Above tables are figured for continuous span with the following stresses, which are very conservative:

500 pounds per square inch, extreme fibre composition in concrete.

16,000 pounds per square inch, tension in steel, (to be medium open hearth).

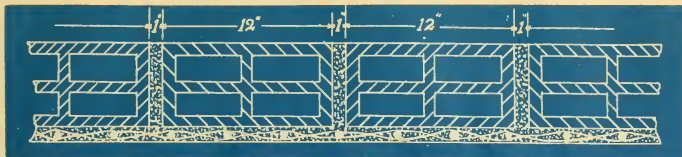
The end sheave and longitudinal sheave should be investigated, and sheave reinforcement provided when necessary.

NOTE—Designs made in accordance with the above table of loads will conform with the building laws of most large cities.

However a more economical design may often be obtained where building laws permit higher stresses.

Our Engineering Dept. is at the entire disposal of anyone desiring further information.

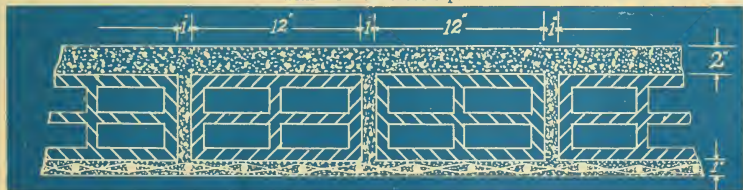
# SAFE LIVE LOADS in lbs. per sq. ft. for JOHNSON SYSTEM FLOOR without concrete top.



Safe Live Load in Pounds per Square Foot—Factor of Safety, 4.

SPAN IN FEET	12-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 55 lbs.	10-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 52 lbs.	9-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 48 lbs.	8-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 45 lbs.	7-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 42 lbs.	6-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 37 lbs.	5-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 35 lbs.	4-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 29 lbs.	3-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 27 lbs.
8	...	...	488	422	324	263	171	125	79
9	...	507	383	333	254	206	132	113	61
10	558	407	308	264	202	163	105	76	48
11	458	337	253	219	165	133	86	62	39
12	386	282	210	179	137	111	71	51	32
13	326	234	178	152	116	93	59	43	...
14	278	202	152	129	98	78	49	36	...
15	241	175	130	111	84	68	42	30	...
16	210	151	113	97	73	58	36	...	...
17	189	133	99	75	63	51	31	...	...
18	164	117	87	72	56	45	...	...	...
19	146	103	77	66	49	39	...	...	...
20	129	92	68	58	43	34	...	...	...
21	117	83	61	51	38	30	...	...	...
22	104	75	54	46	34	...	...	...	...
23	95	67	49	41	30	...	...	...	...
24	86	61	44	37	...	...	...	...	...
25	77	55	39	...	...	...	...	...	...

# SAFE LIVE LOADS in lbs. per sq. ft. for JOHNSON SYSTEM FLOOR with 2 in. concrete top.



Safe Live Load in Pounds per Square Foot—Factor of Safety, 4.

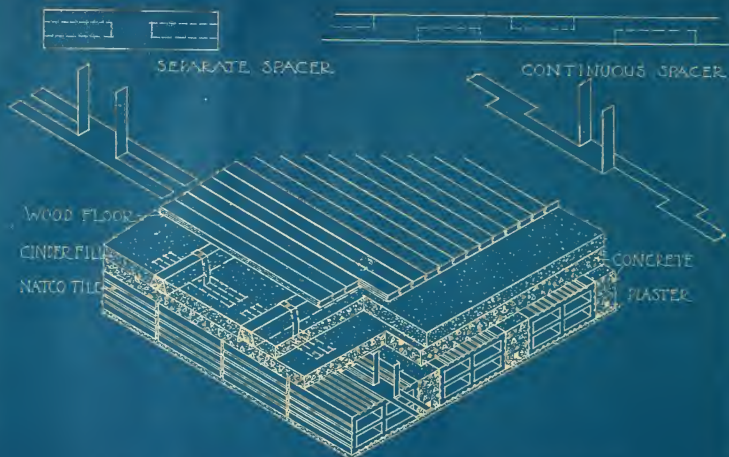
SPAN IN FEET	12-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 79 lbs.	10-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 77 lbs.	9-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 72 lbs.	8-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 69 lbs.	7-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 66 lbs.	6-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 62 lbs.	5-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 59 lbs.	4-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 54 lbs.	3-in. Tile. ★-in. Dia. Rod. Weight of Floor per sq. ft., 51 lbs.
8	...	...	...	...	...	...	...	567	437
9	...	...	...	...	...	...	568	442	342
10	...	...	...	...	...	530	435	354	272
11	...	...	...	...	514	435	355	292	224
12	...	...	572	508	429	365	298	242	187
13	...	568	487	428	364	310	255	204	157
14	...	491	417	358	311	265	215	174	133
15	540	421	362	318	269	230	185	151	115
16	470	368	317	278	236	200	162	132	100
17	415	326	277	243	207	175	142	114	86
18	368	287	245	215	182	155	125	100	76
19	325	251	219	190	161	137	110	89	67
20	292	228	195	170	146	121	98	78	59
21	265	206	175	153	129	108	88	70	52
22	238	185	160	139	116	97	78	63	...
23	218	168	143	125	105	88	70	27	...
24	196	153	130	114	95	80	63	...	...
25	178	138	118	103	86	72	58	...	...

NOTE—Attention is called to the fact that this construction is reinforced in both directions. The reinforcing rods (shown in detail drawing page 86) take the direct strains. The transverse strains are taken by a woven metal fabric running lengthwise of the arch and through this fabric the rods are interwoven at intervals of four inches.

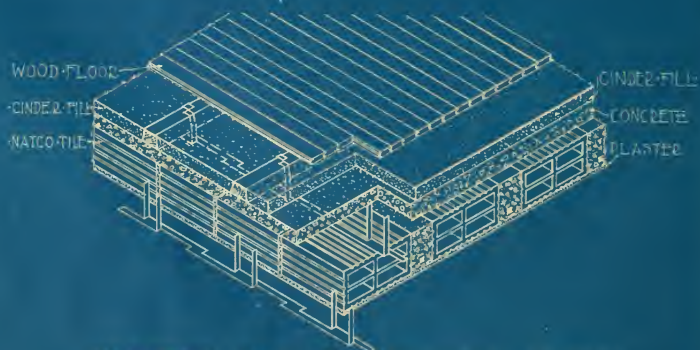
The above table is approximate and should be used for estimating only.



# METHODS OF SECURING WOOD SLEEPERS TO NATCO FIREPROOF FLOORS



ISOMETRIC SHOWING SEPARATE SPACERS



ISOMETRIC SHOWING CONTINUOUS SPACERS

NATCO HOLLOW TILE  
WALL. THE PROJ-  
ECTING DOVETAILS  
ARE SCORED  
FOR STUCCO  
AND PLASTER.

3" FACING  
TILE.

1" TILE SLAB.

CONCRETE SLAB OVER  
TILE WHEN NECESSARY  
TO INCREASE STRENGTH  
OF ARCH.

HOLLOW  
TILE.

CONCRETE BEAMS  
4" WIDE 16" ON CENTERS  
REINFORCED WITH TWISTED  
OR CORRUGATED STEEL BARS

ISOMETRIC PERSPECTIVE  
OF COMBINATION FLOOR CON-  
STRUCTION

SCALE  
ONE FOOT

NATCO HOLLOW TILE  
WALL. THE PROJ-  
ECTING DOVETAILS  
ARE SCORED  
FOR STUCCO  
AND PLASTER.

3" FACING  
TILE

1" TILE SLAB

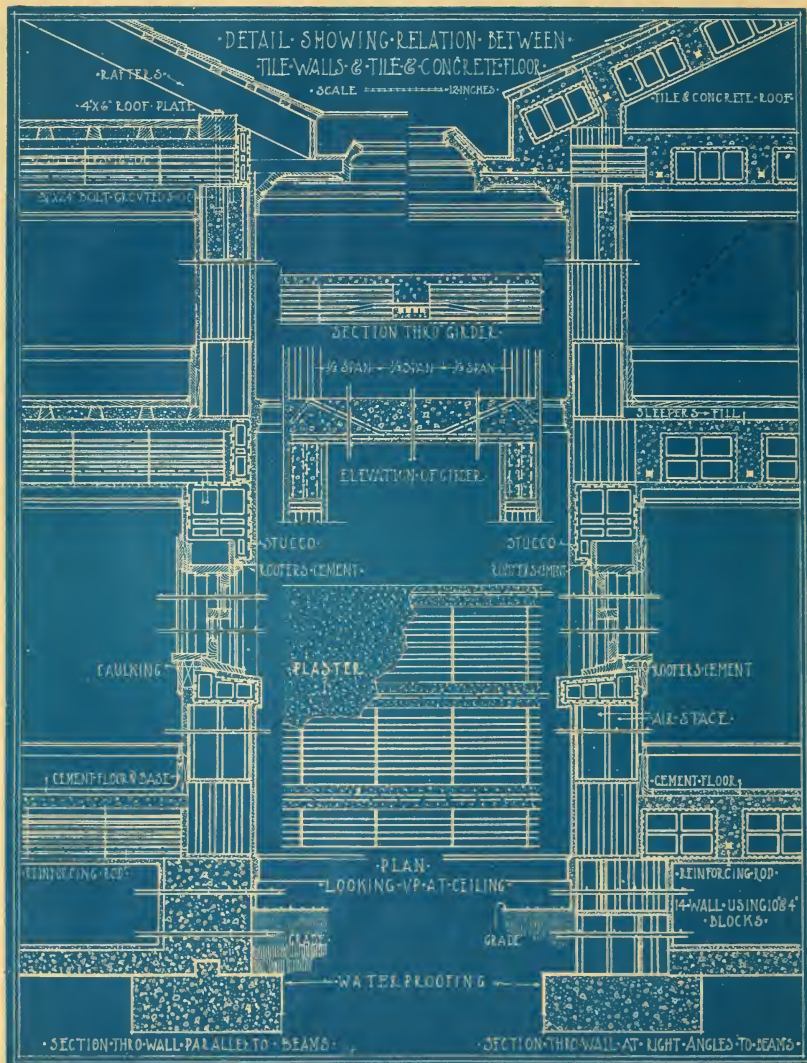
REINFORCED HOLLOW  
TILE FLOOR.

4" CEMENT  
REINFORCED WITH  
RODS AND METAL FABRIC.

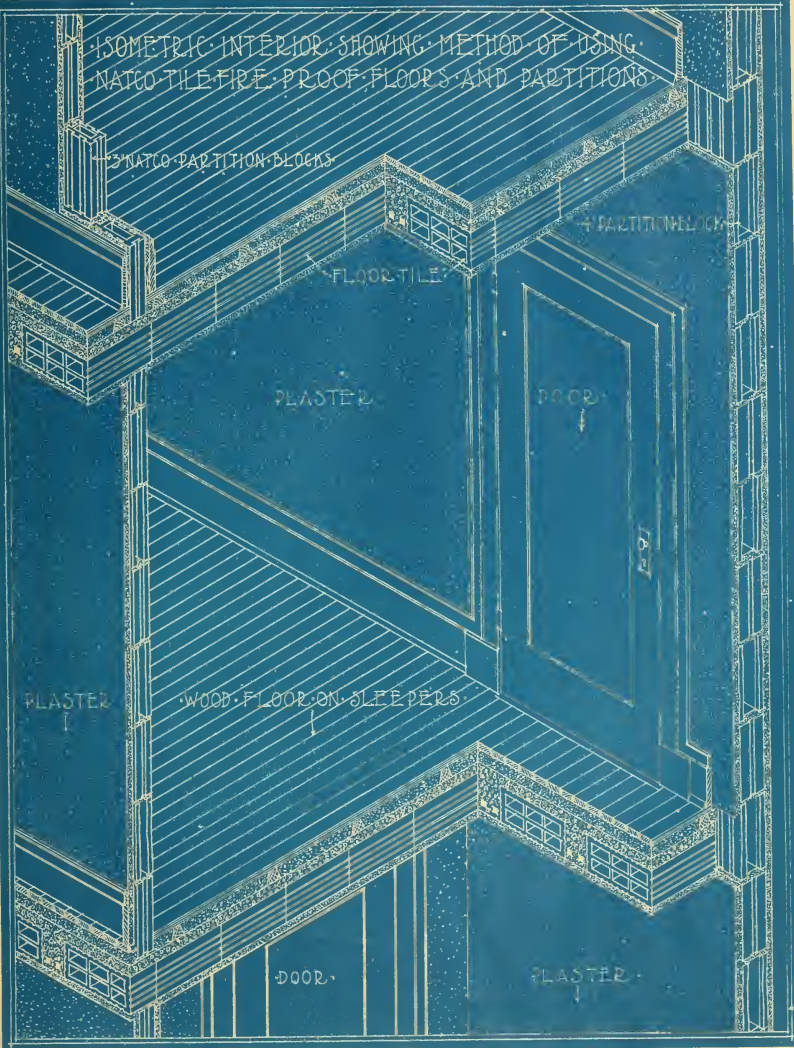
ISOMETRIC PERSPECT-  
IVE OF JOHNSON SYSTEM  
OF FLOOR CONSTRUCTION

SCALE  
ONE FOOT

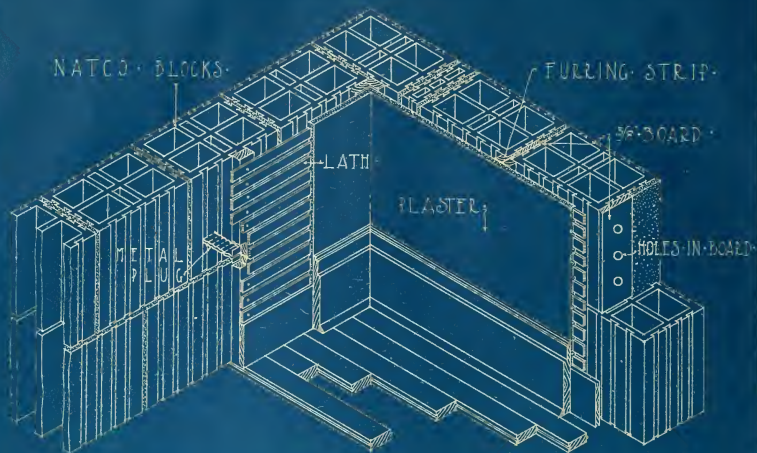




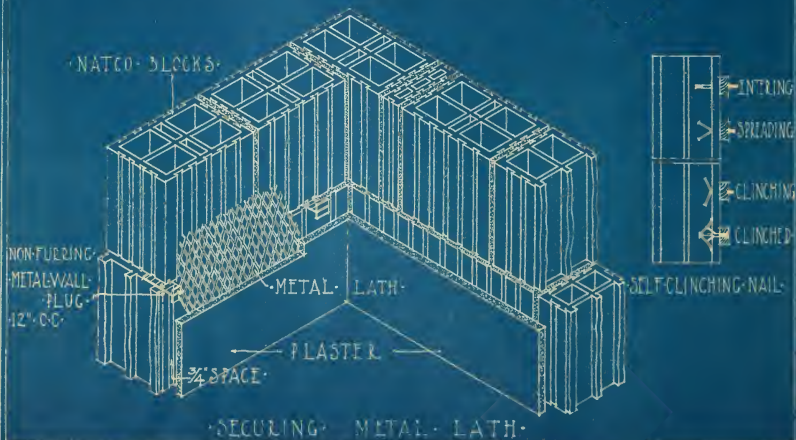
ISOMETRIC INTERIOR SHOWING METHOD OF USING  
NATCO TILE FIRE PROOF FLOORS AND PARTITIONS



# METHOD OF FASTENING TRIM AND FURRING TO NATCO WALLS



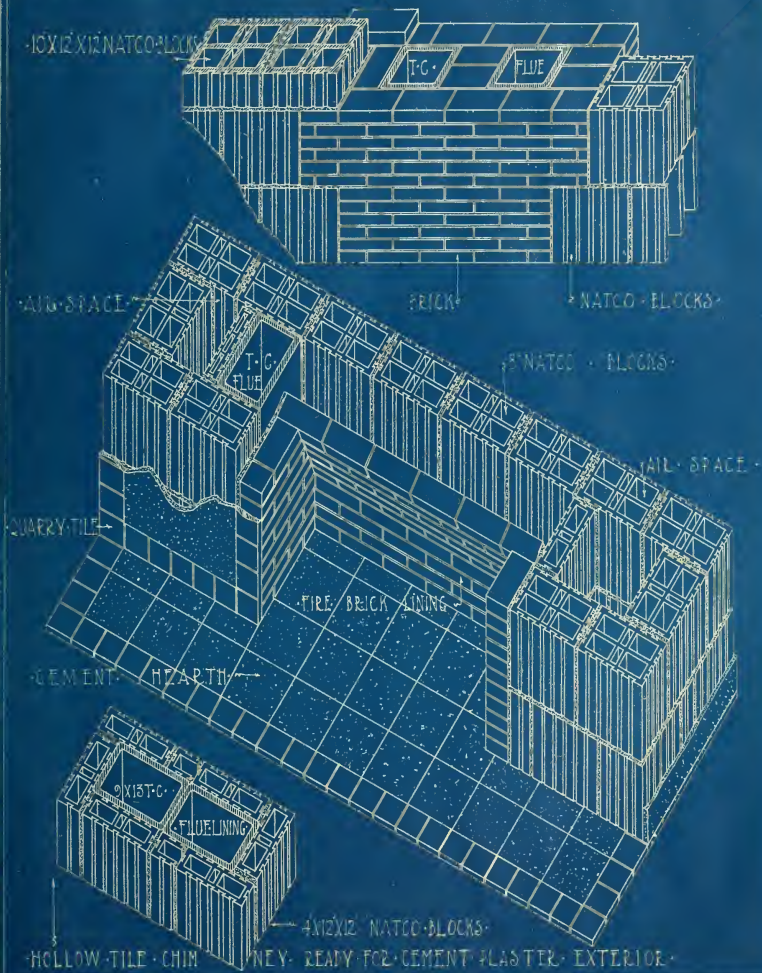
WOOD & METAL PLUGS IN NATCO TILE CONSTRUCTION



SECURING METAL LATH



# BRICK TIE-IN TILE OR CHIMNEY IN TILE WALLS



DETAILS OF ARCHES

FOR PORCH CONSTRUCTION

FINISHED STUCCO

BRICK & CEMENT FILL

3" TILE FILL ROOFING

3" TILE FILL

8" INCH FACE BRICK

BRICK STEP

EXPOSED BRICK ARCH IN TILE WALL FOR PORCHES, ETC.

6" CUT TILE

2" X 8" MATCH TILE

4" X 8" TILE

2" TILE SILL

2" X 8" MATCH

W/ 5" CUT

2" X 8" MATCH

SECTION THROUGH CEMENTAL ARCH OF TILE IN TILE WALL FOR PORCH SECTION THRU ARCH



# DETAILS OF CABLES AND BUTTRESSES

SECTION SHOWING  
RAFTER ON TOP OF  
WALL AND VERGE  
BOARD OUTSIDE

SECTION SHOWING  
RAFTER INSIDE OF  
WALL STUCCO  
OUTSIDE

METHOD OF BUILDING CABLE USING  
FULL STOCK BLOCKS & BRICK FILL

METHOD OF BUILDING CABLE USING  
HALF STOCK BLOCKS & BRICK FILL

ELEVATION  
OF TILE BUT-  
TRESS WITH  
CONCRETE CAPS

SECTION  
SHOWING  
THE BUT-  
TRESS  
WITH  
CONCRETE  
CAPS &  
FILL

ELEVATION  
OF THE BUT-  
TRESS WITH  
TILE CAP

STUCCO

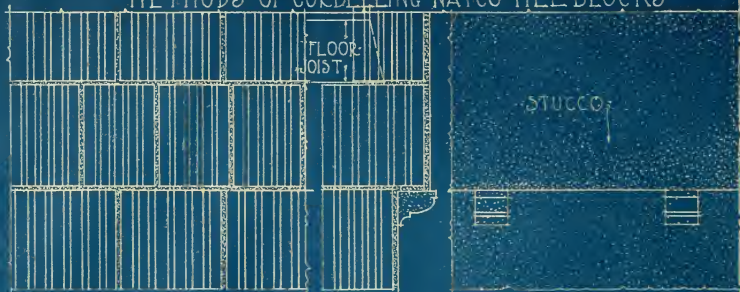
STUCCO

SECTION  
SHOWING  
TILE BUT-  
TRESS  
WITH TILE  
CAP &  
CONCRETE  
FILL

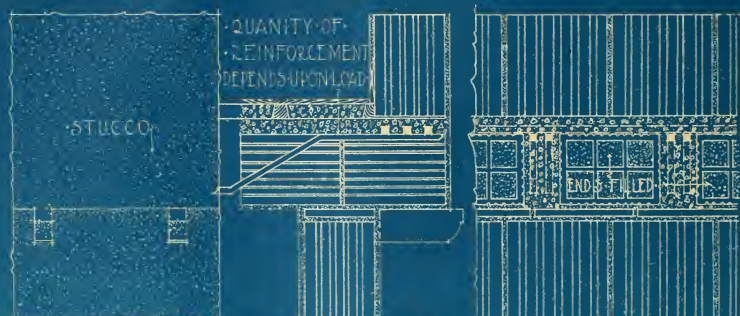
STUCCO

STUCCO

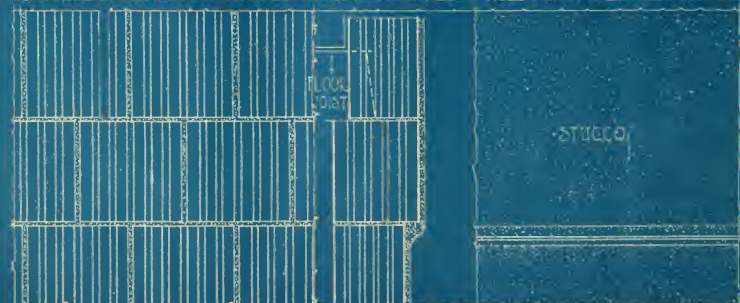
# METHODS OF CORBELLING NATCO TILE BLOCKS.



4" CORBEL IN AN 8" NATCO TILE WALL WITH WOOD FLOOR & LIGHT LOAD



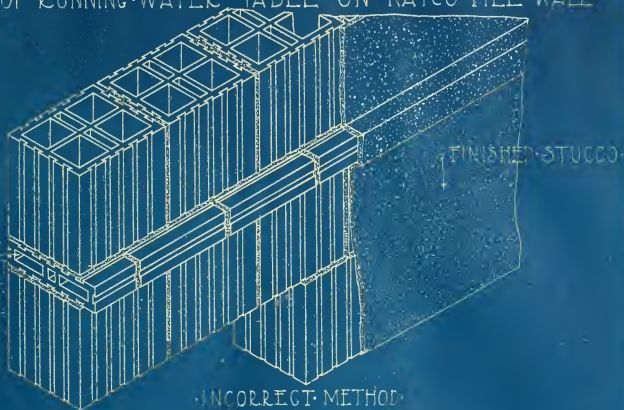
12" CORBEL IN AN 8" NATCO WALL WHERE FIRE-PROOF FLOORS ARE USED



2" CORBEL IN AN 8" NATCO TILE WALL USING 10X12X12 BLOCKS

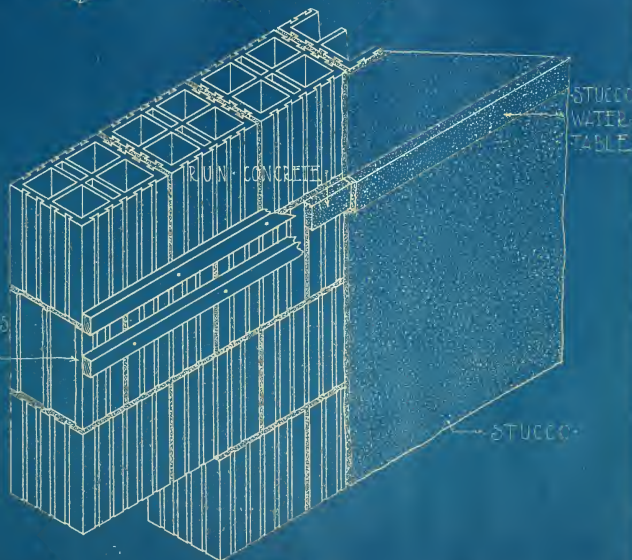
# METHOD OF RUNNING WATER TABLE ON NATCO TILE WALL

WATER CONTAIN-  
WALL BUT NOT LIGHT  
BUSH Laid Flat  
Flat Bed CAUS-  
ING DAMPNES.



INCORRECT METHOD

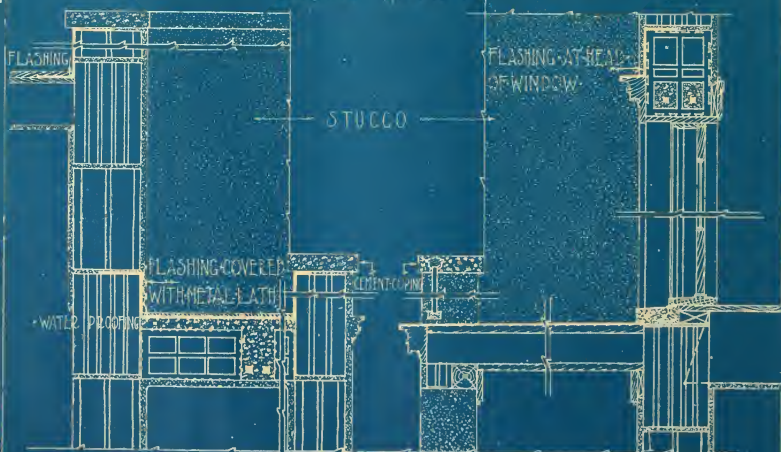
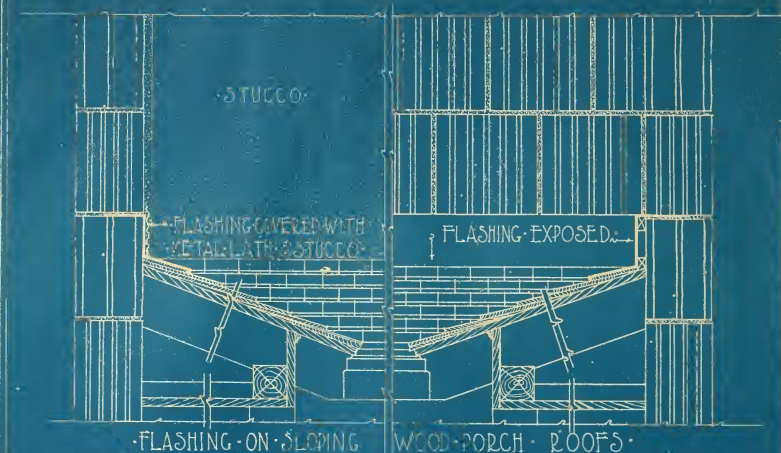
FURRING STRIPS  
FOR FORM



CORRECT METHOD



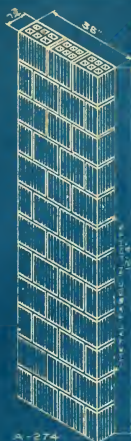
DETAILS SHOWING METHODS OF FLASHING NATCO TILE WALLS



METHOD OF FLASHING FIREPROOF PORCH ROOF

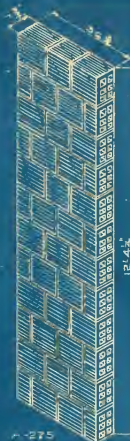
TIN DECK ON FLAT WOOD ROOF





END  
CONSTRUCTION

A-274



SIDE  
CONSTRUCTION

A-275

A-274

OBSERVED		AND CALCULATED RESULTS				REMARKS
TIME	GAUGE	AREA IN COMPRESSION	LOAD IN	HORIZONTAL DEFLECTION	COMPRESSION	
	READING	ACTUAL	LB IN	AT CENTER	OF SECTION	
	IN INCH	LB PER SQ IN ON	SECTION	OF SECTION	IN INCHES	
	SECTION	NET AREA				
	IN INCH	COMPRESSION				
PM	0	0	0	0	0	
10:00	1	1000	1000	0.00	0.00	
10:10	2	2000	2000	0.00	0.00	
10:20	3	3000	3000	0.00	0.00	
10:30	4	4000	4000	0.00	0.00	
10:40	5	5000	5000	0.00	0.00	
10:50	6	6000	6000	0.00	0.00	
11:00	7	7000	7000	0.00	0.00	
11:10	8	8000	8000	0.00	0.00	
11:20	9	9000	9000	0.00	0.00	
11:30	10	10000	10000	0.00	0.00	
11:40	11	11000	11000	0.00	0.00	
11:50	12	12000	12000	0.00	0.00	
12:00	13	13000	13000	0.00	0.00	
12:10	14	14000	14000	0.00	0.00	
12:20	15	15000	15000	0.00	0.00	
12:30	16	16000	16000	0.00	0.00	
12:40	17	17000	17000	0.00	0.00	
12:50	18	18000	18000	0.00	0.00	
1:00	19	19000	19000	0.00	0.00	
1:10	20	20000	20000	0.00	0.00	
1:20	21	21000	21000	0.00	0.00	
1:30	22	22000	22000	0.00	0.00	
1:40	23	23000	23000	0.00	0.00	
1:50	24	24000	24000	0.00	0.00	
2:00	25	25000	25000	0.00	0.00	
2:10	26	26000	26000	0.00	0.00	
2:20	27	27000	27000	0.00	0.00	
2:30	28	28000	28000	0.00	0.00	
2:40	29	29000	29000	0.00	0.00	
2:50	30	30000	30000	0.00	0.00	
3:00	31	31000	31000	0.00	0.00	
3:10	32	32000	32000	0.00	0.00	
3:20	33	33000	33000	0.00	0.00	
3:30	34	34000	34000	0.00	0.00	
3:40	35	35000	35000	0.00	0.00	
3:50	36	36000	36000	0.00	0.00	
4:00	37	37000	37000	0.00	0.00	
4:10	38	38000	38000	0.00	0.00	
4:20	39	39000	39000	0.00	0.00	
4:30	40	40000	40000	0.00	0.00	
4:40	41	41000	41000	0.00	0.00	
4:50	42	42000	42000	0.00	0.00	
5:00	43	43000	43000	0.00	0.00	
5:10	44	44000	44000	0.00	0.00	
5:20	45	45000	45000	0.00	0.00	
5:30	46	46000	46000	0.00	0.00	
5:40	47	47000	47000	0.00	0.00	
5:50	48	48000	48000	0.00	0.00	
6:00	49	49000	49000	0.00	0.00	
6:10	50	50000	50000	0.00	0.00	
6:20	51	51000	51000	0.00	0.00	
6:30	52	52000	52000	0.00	0.00	
6:40	53	53000	53000	0.00	0.00	
6:50	54	54000	54000	0.00	0.00	
7:00	55	55000	55000	0.00	0.00	
7:10	56	56000	56000	0.00	0.00	
7:20	57	57000	57000	0.00	0.00	
7:30	58	58000	58000	0.00	0.00	
7:40	59	59000	59000	0.00	0.00	
7:50	60	60000	60000	0.00	0.00	
8:00	61	61000	61000	0.00	0.00	
8:10	62	62000	62000	0.00	0.00	
8:20	63	63000	63000	0.00	0.00	
8:30	64	64000	64000	0.00	0.00	
8:40	65	65000	65000	0.00	0.00	
8:50	66	66000	66000	0.00	0.00	
9:00	67	67000	67000	0.00	0.00	
9:10	68	68000	68000	0.00	0.00	
9:20	69	69000	69000	0.00	0.00	
9:30	70	70000	70000	0.00	0.00	
9:40	71	71000	71000	0.00	0.00	
9:50	72	72000	72000	0.00	0.00	
10:00	73	73000	73000	0.00	0.00	
10:10	74	74000	74000	0.00	0.00	
10:20	75	75000	75000	0.00	0.00	
10:30	76	76000	76000	0.00	0.00	
10:40	77	77000	77000	0.00	0.00	
10:50	78	78000	78000	0.00	0.00	
11:00	79	79000	79000	0.00	0.00	
11:10	80	80000	80000	0.00	0.00	
11:20	81	81000	81000	0.00	0.00	
11:30	82	82000	82000	0.00	0.00	
11:40	83	83000	83000	0.00	0.00	
11:50	84	84000	84000	0.00	0.00	
12:00	85	85000	85000	0.00	0.00	
12:10	86	86000	86000	0.00	0.00	
12:20	87	87000	87000	0.00	0.00	
12:30	88	88000	88000	0.00	0.00	
12:40	89	89000	89000	0.00	0.00	
12:50	90	90000	90000	0.00	0.00	
1:00	91	91000	91000	0.00	0.00	
1:10	92	92000	92000	0.00	0.00	
1:20	93	93000	93000	0.00	0.00	
1:30	94	94000	94000	0.00	0.00	
1:40	95	95000	95000	0.00	0.00	
1:50	96	96000	96000	0.00	0.00	
2:00	97	97000	97000	0.00	0.00	
2:10	98	98000	98000	0.00	0.00	
2:20	99	99000	99000	0.00	0.00	
2:30	100	100000	100000	0.00	0.00	

PAID AT 1000 LB BY CRUSHING AND SPALLING  
AT 1000 LB AND 1000 LB CRUSHING AND SPALLING  
SHOWN VERTICAL CRACKS AT CENTER OF WIDTH  
IN BOTH WALLS.

A-275

OBSERVED		AND CALCULATED RESULTS				REMARKS
TIME	GAUGE READING	AREA IN COMPRESSION	LOAD IN	HORIZONTAL DEFLECTION AT CENTER OF SECTION	COMPRESSION OF SECTION IN INCHES	
		ACTUAL	LOAD IN LB PER SQ IN ON SECTION	IN INCHES		
		LB	NET AREA OF TUB. COMPRESSION			
PM	0	0				
2:45	1	8000	3.7	0.00	0.00	
2:55	2	8000	7.4	0.00	0.00	
3:05	3	8000	11.1	0.00	0.00	
3:15	4	8000	14.8	0.00	0.00	
3:25	5	8000	18.5	0.00	0.00	
3:35	6	8000	22.2	0.00	0.00	
3:45	7	8000	25.9	0.00	0.00	
3:55	8	8000	29.6	0.00	0.00	
4:05	9	8000	33.3	0.00	0.00	
4:15	10	8000	37.0	0.00	0.00	
4:25	11	8000	40.7	0.00	0.00	
4:35	12	8000	44.4	0.00	0.00	
4:45	13	8000	48.1	0.00	0.00	
4:55	14	8000	51.8	0.00	0.00	
5:05	15	8000	55.5	0.00	0.00	
5:15	16	8000	59.2	0.00	0.00	
5:25	17	8000	62.9	0.00	0.00	
5:35	18	8000	66.6	0.00	0.00	
5:45	19	8000	70.3	0.00	0.00	
5:55	20	8000	74.0	0.00	0.00	
6:05	21	8000	77.7	0.00	0.00	
6:15	22	8000	81.4	0.00	0.00	
6:25	23	8000	85.1	0.00	0.00	
6:35	24	8000	88.8	0.00	0.00	
6:45	25	8000	92.5	0.00	0.00	
6:55	26	8000	96.2	0.00	0.00	
7:05	27	8000	99.9	0.00	0.00	
7:15	28	8000	103.6	0.00	0.00	
7:25	29	8000	107.3	0.00	0.00	
7:35	30	8000	111.0	0.00	0.00	
7:45	31	8000	114.7	0.00	0.00	
7:55	32	8000	118.4	0.00	0.00	
8:05	33	8000	122.1	0.00	0.00	
8:15	34	8000	125.8	0.00	0.00	
8:25	35	8000	129.5	0.00	0.00	
8:35	36	8000	133.2	0.00	0.00	
8:45	37	8000	136.9	0.00	0.00	
8:55	38	8000	140.6	0.00	0.00	
9:05	39	8000	144.3	0.00	0.00	
9:15	40	8000	148.0	0.00	0.00	
9:25	41	8000	151.7	0.00	0.00	
9:35	42	8000	155.4	0.00	0.00	
9:45	43	8000	159.1	0.00	0.00	
9:55	44	8000	162.8	0.00	0.00	
10:05	45	8000	166.5	0.00	0.00	
10:15	46	8000	170.2	0.00	0.00	
10:25	47	8000	173.9	0.00	0.00	
10:35	48	8000	177.6	0.00	0.00	
10:45	49	8000	181.3	0.00	0.00	
10:55	50	8000	185.0	0.00	0.00	
11:05	51	8000	188.7	0.00	0.00	
11:15	52	8000	192.4	0.00	0.00	
11:25	53	8000	196.1	0.00	0.00	
11:35	54	8000	199.8	0.00	0.00	
11:45	55	8000	203.5	0.00	0.00	
11:55	56	8000	207.2	0.00	0.00	
12:05	57	8000	210.9	0.00	0.00	
12:15	58	8000	214.6	0.00	0.00	
12:25	59	8000	218.3	0.00	0.00	
12:35	60	8000	222.0	0.00	0.00	
12:45	61	8000	225.7	0.00	0.00	
12:55	62	8000	229.4	0.00	0.00	
1:05	63	8000	233.1	0.00	0.00	
1:15	64	8000	236.8	0.00	0.00	
1:25	65	8000	240.5	0.00	0.00	
1:35	66	8000	244.2	0.00	0.00	
1:45	67	8000	247.9	0.00	0.00	
1:55	68	8000	251.6	0.00	0.00	
2:05	69	8000	255.3	0.00	0.00	
2:15	70	8000	259.0	0.00	0.00	
2:25	71	8000	262.7	0.00	0.00	
2:35	72	8000	266.4	0.00	0.00	
2:45	73	8000	270.1	0.00	0.00	
2:55	74	8000	273.8	0.00	0.00	
3:05	75	8000	277.5	0.00	0.00	
3:15	76	8000	281.2	0.00	0.00	
3:25	77	8000	284.9	0.00	0.00	
3:35	78	8000	288.6	0.00	0.00	
3:45	79	8000	292.3	0.00	0.00	
3:55	80	8000	296.0	0.00	0.00	
4:05	81	8000	299.7	0.00	0.00	
4:15	82	8000	303.4	0.00	0.00	
4:25	83	8000	307.1	0.00	0.00	
4:35	84	8000	310.8	0.00	0.00	
4:45	85	8000	314.5	0.00	0.00	
4:55	86	8000	318.2	0.00	0.00	
5:05	87	8000	321.9	0.00	0.00	
5:15	88	8000	325.6	0.00	0.00	
5:25	89	8000	329.3	0.00	0.00	
5:35	90	8000	333.0	0.00	0.00	
5:45	91	8000	336.7	0.00	0.00	
5:55	92	8000	340.4	0.00	0.00	
6:05	93	8000	344.1	0.00	0.00	
6:15	94	8000	347.8	0.00	0.00	
6:25	95	8000	351.5	0.00	0.00	
6:35	96	8000	355.2	0.00	0.00	
6:45	97	8000	358.9	0.00	0.00	
6:55	98	8000	362.6	0.00	0.00	
7:05	99	8000	366.3	0.00	0.00	
7:15	100	8000	370.0	0.00	0.00	
7:25	101	8000	373.7	0.00	0.00	
7:35	102	8000	377.4	0.00	0.00	
7:45	103	8000	381.1	0.00	0.00	
7:55	104	8000	384.8	0.00	0.00	
8:05	105	8000	388.5	0.00	0.00	
8:15	106	8000	392.2	0.00	0.00	
8:25	107	8000	395.9	0.00	0.00	
8:35	108	8000	399.6	0.00	0.00	
8:45	109	8000	403.3	0.00	0.00	
8:55	110	8000	407.0	0.00	0.00	
9:05	111	8000	410.7	0.00	0.00	
9:15	112	8000	414.4	0.00	0.00	
9:25	113	8000	418.1	0.00	0.00	
9:35	114	8000	421.8	0.00	0.00	
9:45	115	8000	425.5	0.00	0.00	
9:55	116	8000	429.2	0.00	0.00	
10:05	117	8000	432.9	0.00	0.00	
10:15	118	8000	436.6	0.00	0.00	
10:25	119	8000	440.3	0.00	0.00	
10:35	120	8000	444.0	0.00	0.00	
10:45	121	8000	447.7	0.00	0.00	
10:55	122	8000	451.4	0.00	0.00	
11:05	123	8000	455.1	0.00	0.00	
11:15	124	8000	458.8	0.00	0.00	
11:25	125	8000	462.5	0.00	0.00	
11:35	126	8000	466.2	0.00	0.00	
11:45	127	8000	469.9	0.00	0.00	
11:55	128	8000	473.6	0.00	0.00	
12:05	129	8000	477.3	0.00	0.00	
12:15	130	8000	481.0	0.00	0.00	
12:25	131	8000	484.7	0.00	0.00	
12:35	132	8000	488.4	0.00	0.00	
12:45	133	8000	492.1	0.00	0.00	
12:55	134	8000	495.8	0.00	0.00	
1:05	135	8000	499.5	0.00	0.00	
1:15	136	8000	503.2	0.00	0.00	
1:25	137	8000	506.9	0.00	0.00	
1:35	138	8000	510.6	0.00	0.00	
1:45	139	8000	514.3	0.00	0.00	
1:55	140	8000	518.0	0.00	0.00	
2:05	141	8000	521.7	0.00	0.00	
2:15	142	8000	525.4	0.00	0.00	
2:25	143	8000	529.1	0.00	0.00	
2:35	144	8000	532.8	0.00	0.00	
2:45	145	8000	536.5	0.00	0.00	
2:55	146	8000	540.2	0.00	0.00	
3:05	147	8000	543.9	0.00	0.00	
3:15	148	8000	547.6	0.00	0.00	
3:25	149	8000	551.3	0.00	0.00	
3:35	150	8000	555.0	0.00	0.00	
3:45	151	8000	558.7	0.00	0.00	
3:55	152	8000	562.4	0.00	0.00	
4:05	153	8000	566.1	0.00	0.00	
4:15	154	8000	569.8	0.00	0.00	
4:25	155	8000	573.5	0.00	0.00	
4:35	156	8000	577.2	0.00	0.00	
4:45	157	8000	580.9	0.00	0.00	
4:55	158	8000	584.6	0.00	0.00	
5:05	159	8000	588.3	0.00	0.00	
5:15	160	8000	592.0	0.00	0.00	
5:25	161	8000	595.7	0.00	0.00	
5:35	162	8000	599.4	0.00	0.00	
5:45	163	8000	603.1	0.00	0.00	
5:55	164	8000	606.8	0.00	0.00	
6:05	165	8000	610.5	0.00	0.00	
6:15	166	8000	614.2	0.00	0.00	
6:25	167	8000	617.9	0.00	0.00	
6:35	168	8000	621.6	0.00	0.00	
6:45	169	8000	625.3	0.00	0.00	
6:55</						





